

Claims

1. A seat belt device comprising:

a seat belt that can be drawn out and wound up so as to restrain a passenger in a vehicle to a seat;

a locking device for locking an operation of drawing out the seat belt as needed;

an acceleration sensor for actuating the locking device;

an angle detection device for detecting a reclining angle of a backrest of the seat; and

a sensor controller that brings the acceleration sensor into an operable state when the reclining angle is within a range where the passenger wears the seat belt and brings the acceleration sensor into an inoperable state when the reclining angle is within a range where the passenger does not wear the seat belt, on the basis of the detection result from the angle detection device.

2. The seat belt device according to Claim 1, wherein an initial position of the backrest is a position where the backrest is reclined by a predetermined angle with respect to a vertical direction, the range where the passenger does not wear the seat belt is a range where the backrest is reclined forward by about 10 degrees or more from the initial position, and the range where the passenger wears the seat belt is a remaining range.

3. The seat belt device according to Claim 1 or 2, wherein the backrest of the seat is rotatably connected to a seating portion on which the passenger sits, and the acceleration sensor is mounted in the backrest of the seat,

wherein the sensor controller comprises:

a posture controller for orienting the acceleration sensor in the vertical direction; and

an interlocking member for allowing the posture controller to interlock with the angle detection device,

wherein the angle detection device is a link mechanism that is disposed in a connecting portion between the backrest and the seating portion of the seat so as to detect a rotation angle of the backrest and to rotate the interlocking member of the sensor controller in accordance with the rotation angle, and

wherein the posture controller of the sensor controller controls the acceleration sensor to be kept horizontal by means of the rotation of the interlocking member of the sensor controller when the reclining angle is within the range where the passenger wears the seat belt, and the posture controller of the sensor controller does not interlock with the angle detection device when the reclining angle is within the range where the passenger does not wear the seat belt.

4. The seat belt device according to any one of Claims 1 to 3, wherein the sensor controller further comprises a sensor

deactivator that detects a winding amount of the seat belt when the reclining angle is within the range where the passenger does not wear the seat belt and deactivates the acceleration sensor.

5. The seat belt device according to Claim 3 or 4, wherein the angle detection device comprises:

a first detective member that is fixed to the seating portion of the seat so as to detect the rotation angle of the backrest;

a second detective member that is fixed to the backrest so as to detect the rotation angle of the backrest and is connected to the first detective member by means of a first turning pair;

a first link member of which an end is connected to the first detective member by means of a second turning pair; and

a second link member of which an end is connected to the other end of the first link member by means of a third turning pair and the other end is connected to the second detective member by means of a fourth turning pair, and

wherein the rotation of the second link member by the fourth turning pair is transmitted to the posture controller through the interlocking member.

6. The seat belt device according to Claim 5, wherein the angle detection device is housed in the second detective member that also serves as a housing case.

7. The seat belt device according to any one of Claims 3 to 6, wherein the acceleration sensor is a sensor-weight type acceleration sensor,

wherein the posture controller comprises a sensor-weight casing that houses a sensor weight and is pivotably mounted in the backrest, a cam groove formed in the sensor-weight casing, and a posture control lever that slides in the cam groove by means of the interlocking member, and

wherein the posture control lever slides in the cam groove so as to keep the sensor-weight casing horizontal when the reclining angle is within the range where the passenger wears the seat belt, and the sensor control lever does not interlock with the angle detection device when the reclining angle is within the range where the passenger does not wear the seat belt.

8. The seat belt device according to any one of Claims 3 to 7, wherein the interlocking member is a flexible cable.

9. A seat belt device comprising a seat belt for restraining a passenger in a vehicle to a seat and a retractor for drawing out and winding up the seat belt,

wherein the retractor comprises a locking device for locking an operation of drawing out the seat belt as needed, an acceleration sensor for actuating the locking device, and a posture controller for controlling a posture of the acceleration sensor, and

wherein the seat belt device further comprises:

an angle detection device for detecting a rotation angle of a backrest of the seat; and

an interlocking member for allowing the posture controller to interlock with the angle detection device.

10. The seat belt device according to Claim 9, wherein an initial position of the backrest of the seat is a position where the backrest is reclined backward by a predetermined angle with respect to a vertical direction, and the interlocking member does not interlock with any within a range where the backrest is reclined forward by about 10 degrees or more from the initial position.

11. The seat belt device according to Claim 9 or 10, wherein the backrest of the seat is rotatably connected to a seating portion on which the passenger sits,

wherein the acceleration sensor is mounted in the backrest of the seat,

wherein the angle detection device is a link mechanism that is disposed in a connecting portion between the backrest and the seating portion of the seat so as to detect the rotation angle of the backrest and to rotate the interlocking member in accordance with the rotation angle, and

wherein the posture controller controls the acceleration sensor to be kept horizontal by means of the rotation of the interlocking member when the reclining angle

is within the range where the passenger wears the seat belt.

12. The seat belt device according to any one of Claims 9 to 11, wherein the posture controller does not interlock with the angle detection device when the reclining angle is within the range where the passenger does not wear the seat belt.

13. The seat belt device according to any one of Claims 9 to 12, wherein the retractor further comprises a sensor deactivator that detects a winding amount of the seat belt when the reclining angle is within the range where the passenger does not wear the seat belt and deactivates the acceleration sensor.

14. The seat belt device according to any one of Claims 9 to 13, wherein the acceleration sensor is a sensor-weight type acceleration sensor,

wherein the retractor further comprises a sensor-weight casing that houses a sensor weight of the acceleration sensor and is pivotably mounted in the retractor and a posture control lever that is activated by the interlocking member,

wherein a cam groove in which the posture control lever slides is formed in the sensor-weight casing, and

wherein the posture control lever slides in the cam groove so as to keep the sensor-weight casing horizontal when the reclining angle is within the range where the passenger wears the seat belt.